

# SUCTION HEAD FOR VACUUM CLEANER

## BACKGROUND OF THE INVENTION

### 5 1. Field of the Invention

The present invention relates to a suction head for a vacuum cleaner, and more particularly, to a suction head for a vacuum cleaner which can efficiently suck alien substances and prevent the alien substances from getting tangled.

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### 2. Description of the Background Art

Referring to Fig. 1, a conventional vacuum cleaner includes a main body 1 having a fan motor for generating a suction force, a suction tube 2 connected to the suction side of the main body 1, a connection tube 4 connected to the suction tube 2, and a suction head 5 connected to the connection tube 4, for sucking alien substances such as dust from the outside by the suction force generated by the fan motor.

As shown in Fig. 2, the suction head 5 is comprised of a casing 12 having a suction port 11, a suction nozzle 13 for collecting the alien substances sucked from the suction port 11, an agitator 14 rotatably installed inside the suction port 11, and rotated for brushing the alien substances, a plurality of brushes 14a being formed on the outside surface of which, a driving motor 15 for providing a driving force for rotating the agitator 14, and a rotational force

transmitting unit having a driving pulley 16 connected to a motor shaft of the driving motor 15, for transmitting a rotational force of the driving motor 15 to the agitator 14, a driven pulley 17 mounted in one side of the agitator 14, and a timing belt 18 for connecting the driving pulley 16 to the driven pulley 17.

5 In the conventional vacuum cleaner, when power is on and the fan motor installed inside the main body 1 is rotated, the suction force is generated in the suction port 11 of the suction head 5 due to the suction force of the fan motor. Alien substances such as dust are sucked from the floor to the suction port 11 by the suction force, and sucked to the main body 1 through the  
10 connection tube 4 and the suction tube 2.

Here, when the driving motor 15 of the suction head 5 is rotated, the rotational force of the driving motor 15 is transmitted to the agitator 14 through the driving pulley 16, the timing belt 18 and the driven pulley 17, and thus the agitator 14 is rotated by 360°. The brushes 14a formed on the outside surface  
15 of the agitator 14 separate alien substances such as dust from the floor by the rotation of the agitator 14, to easily suck dust from the floor.

In the suction head 5 for the conventional vacuum cleaner, the driven pulley 17 connected to the timing belt 18 occupies a predetermined area on the outside surface of the agitator 14, and thus the brushes 14a are not formed on  
20 the outside surface of the agitator 14 on which the driven pulley 17 is installed. Accordingly, alien substances are not normally brushed in the area where the brushes 14a are not formed, and thus not easily sucked to the suction port 11. As a result, cleaning performance of the vacuum cleaner is reduced.

In addition, the agitator 14 is rotated by 360°, and thus thin and long alien substances such as hairs or threads get wound or tangled on the brushes 14a, to deteriorate operation effects of the brushes 14a. Therefore, cleaning performance of the vacuum cleaner is reduced, and such alien substances  
5 need to be removed.

## SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to provide a suction head  
10 for a vacuum cleaner which can improve cleaning performance of the vacuum cleaner by installing brushes on the whole surface of an agitator of a suction port in the length direction and preventing thin and long alien substances such as hairs or threads from getting tangled, by forming the agitator to perform reciprocating rotation in a predetermined angle range.

15 To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided a suction head for a vacuum cleaner, including: a casing having a suction port for sucking alien substances from the floor; an agitator rotatably installed inside the suction port, a plurality of brushes being arranged  
20 on the agitator in the length direction; and an agitator driving unit for driving the agitator to perform reciprocating rotation in a predetermined angle range.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed

description of the present invention when taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

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The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

10 In the drawings:

Fig. 1 is a perspective diagram illustrating a conventional vacuum cleaner;

Fig. 2 is a schematic diagram illustrating a suction head for the conventional vacuum cleaner;

15 Fig. 3 is a schematic diagram illustrating a suction head for a vacuum cleaner in accordance with the present invention;

Fig. 4 is a perspective diagram illustrating a driving motor and an agitator installed in the suction head for the vacuum cleaner in accordance with the present invention; and

20 Figs. 5A to 5D are operation status diagrams illustrating a series of operations of the driving motor and the agitator installed in the suction head for the vacuum cleaner in accordance with the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

A suction head for a vacuum cleaner in accordance with the present invention will now be described with reference to the accompanying drawings.

As illustrated in Figs. 3 and 4, the suction head 100 for the vacuum cleaner includes a casing 102 having a suction port 101 for sucking alien substances from the floor in its lower side, a suction nozzle 103 installed inside the casing 102, for collecting the alien substances sucked from the suction port 101, a volume of which being reduced from the suction port 101 to the opposite side, an agitator 104 having a cylindrical agitator body 104a rotatably installed inside the suction port 101, and a plurality of brushes 104b installed on the outside surface of the agitator body 104a, for brushing alien substances from the floor, a driving motor 105 for generating a driving force for driving the agitator 104, and a driving force transmitting unit 106 for transmitting the driving force of the driving motor 105 to the agitator 104, so that the agitator 104 can perform reciprocating rotation in a predetermined angle range.

The brushes 104b installed in the agitator 104 are evenly arranged in the length direction of the agitator 104. Preferably, the brushes 104b are installed in rows in the length direction of the agitator 104, which is not intended to be limiting. That is, the brushes 104b are formed in at least one row in the

rotation angle range of the agitator 104. In addition, considering that the agitator 104 is rotated in the predetermined angle range, the brushes 104b need not to be installed in the whole circumferential direction of the agitator 140 but limitedly installed in the lower side of the agitator 104 in the length direction, which cuts  
5 down manufacturing expenses.

The driving force transmitting unit 106 is comprised of a rotary link 111 being fixed to a motor shaft 114 of the driving motor 105 and rotated coaxially to the motor shaft 114, and having a first hinge hole 111a on the eccentric position from its rotation center, a hinge bracket 113 being fixed to one side of the outer  
10 circumference of the agitator 104, and having a second hinge hole 113a, and a connecting rod 112 having a first hinge shaft 112a protruded from its one end and slidably inserted into the first hinge hole 111a of the rotary link 111, and a second hinge shaft 112b protruded from its other end and slidably inserted into the second hinge hole 113a of the hinge bracket 113, and performing angular  
15 reciprocating rotation by the rotation of the rotary link 112.

Here, the hinge holes 111a and 113a are formed on the rotary link 111 and the hinge bracket 113, and the hinge shafts 112a and 112b are protruded from both ends of the connecting rod 112, which is not intended to be limiting. That is, the hinge shafts can be protruded from the rotary link 111 and the hinge  
20 bracket 113, and the hinge holes can be formed on both ends of the connecting rod 112.

The operation of the suction head for the vacuum cleaner in accordance with the present invention will now be described with reference to Figs. 5A to 5D.

Here, the motion directions of each member are seen from the accompanying drawings, which are not intended to be limiting.

When power is transmitted to the vacuum cleaner, a suction force is generated in the suction port 101 of the suction head due to a suction force  
5 generated in a main body of the vacuum cleaner, and alien substances such as dust are sucked from the floor 121 to the main body through the suction port 101 by the suction force.

The driving motor 105 of the suction head 100 generates a rotational force. When the rotational force of the driving motor 105 is transmitted to the  
10 agitator 104 through the driving force transmitting unit 106, the agitator 104 performs the reciprocating rotation in the predetermined angle range. Alien substances such as dust are separated from the floor 121 by the brushes 104b formed on the outside surface of the agitator 104 in the length direction, and sucked through the suction port 101.

15 That is, as depicted in Figs. 5A and 5B, when the rotary link 111 is rotated in the anticlockwise direction by the rotation of the driving motor 105, the connecting rod 112 moves to the left direction, and thus the agitator 104 connected to the connecting rod 112 through the hinge bracket 113 is rotated in the anticlockwise direction in a predetermined angle.

20 As shown in Figs. 5C and 5D, when the part of the connecting rod 112 connected to the rotary link 111 crosses 180° position of the rotary link 111, the connecting rod 112 moves to the right direction, and thus the agitator 104 connected to the connecting rod 112 through the hinge bracket 113 is rotated in

the clockwise direction in a predetermined angle.

In addition, when the part of the connecting rod 112 connected to the rotary link 111 crosses 0° position of the rotary link 111, the agitator 104 is re-rotated in the anticlockwise direction in a predetermined angle.

5 Accordingly, the agitator 104 performs the reciprocating rotation in the predetermined angle range. The brushes 104b can easily brush the floor 121 by the rotation of the agitator 104, to easily suck alien substances from the floor 121.

As discussed earlier, the suction head for the vacuum cleaner in  
10 accordance with the present invention prevents thin and long alien substances such as hairs or threads from getting wound or tangled on the agitator, by forming the agitator to perform the reciprocating rotation in the predetermined angle range.

Moreover, the suction head for the vacuum cleaner evenly brushes the  
15 whole area of the suction head by installing the brushes on the whole surface of the agitator in the length direction, by forming the agitator to perform the reciprocating rotation in the predetermined angle range, which improves cleaning performance of the vacuum cleaner.

As the present invention may be embodied in several forms without  
20 departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the



appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalence of such metes and bounds are therefore intended to be embraced by the appended claims.